Aruba AP-120 Series Indoor Access Point

Installation Guide

About the Aruba AP-120 Series Access Points

The Aruba AP-120 series of wireless access points support the imminent IEEE 802.11n (currently draft 2.0) standard for high-performance WLAN. These access points use MIMO (Multiple-in, Multiple-out) technology and other high-throughput mode techniques to deliver high-performance, pre-802.11n 2.4 GHz and 5 GHz functionality while simultaneously supporting existing 802.11a/b/g wireless services. The AP-120 series access points are available in versions with single or dual radios and with integrated antennas or RP-SMA interfaces that support detachable antennas. The AP-120 series access points work only in conjunction with an Aruba Mobility Controller.

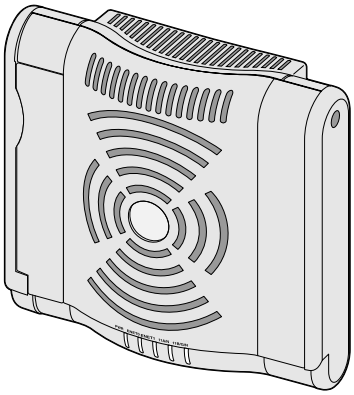
The Aruba AP-120 series access points provide the following capabilities:

- Wireless transceiver
- Protocol-independent networking functionality
- IEEE 802.11a/b/g or 802.11n operation as a wireless access point
- IEEE 802.11a/b/g or 802.11n operation as a wireless air monitor
- Compatibility with IEEE 802.3af PoE as well as high power over Ethernet pre-standards (PoE + / 802.3at)
- Central management configuration and upgrades through an Aruba Mobility Controller
- Upgrade of AP-12x a/b/g models to 802.11n (draft) compliance through a controller license

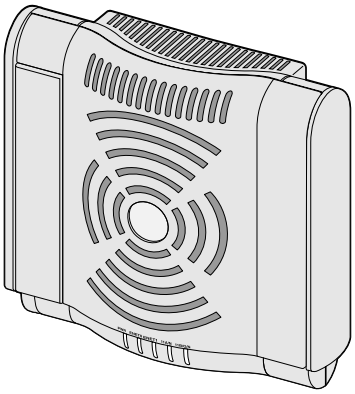
The AP-12x a/b/g APs *require* ArubaOS 3.3.1.9 (or later). If you are running an earlier version of ArubaOS, upgrade before installing the APs.

When installing the license to upgrade your AP-12x a/b/g AP to 802.11n compliance, you must reboot the AP for the upgrade to take effect.

Figure 1 *AP-120 Series Access Points*



AP-120/124
(3 x RP-SMA interfaces for detachable antennas)



AP-121/125
(3 x integrated dual-band antennas)

Package Contents

- AP-120 series access point
- Installation guide (this document)

Inform your supplier if there are any incorrect, missing, or damaged parts. If possible, retain the carton, including the original packing materials. Use these materials to repack and return the unit to the supplier if needed.

Additional mounting kits for use with the AP-120 series access points are sold separately. Contact your Aruba sales representative for details.

Before You Begin

WLAN Planning

Determine how many Aruba APs are needed for your wireless network deployment and where they will be installed. You can easily accomplish this planning using Aruba's automated RF Plan site-survey software (available separately). This process is considered WLAN or RF planning and should have been completed during the master Aruba Mobility Controller installation and configuration. In typical Aruba installations, the mobility controllers are configured and installed before the APs.

For WLAN planning assistance, refer to the *Indoor Access Points: Site Survey and Planning Pre-Deployment Guide* and the *RF Plan Installation and User Guide*.

Pre-Installation Network Requirements

After WLAN planning is complete and the appropriate products and their placement have been determined, the Aruba Mobility Controller(s) must be installed and initial setup performed before the Aruba Access Points are deployed.

For initial setup of the Mobility Controller, refer to the *ArubaOS Quick Start Guide* for the software version installed on your controller.

Pre-Installation Checklist

Before installing your AP-120 series access point, be sure that you have the following:

- For the AP-120/AP-124: External antennas as specified in the network deployment plan
- CAT5 UTP cable of required length
- One of the following power sources:
  - IEEE 802.3af-compliant Power over Ethernet (PoE) source
  - Supports full functionality for AP-120/AP-121; supports reduced functionality for AP-124/AP-125
  - IEEE Power Over Ethernet + (PoE+) source output at 56 Volts @ 350 mA
  - The POE source can be any power source equipment (PSE) controller or midspan PSE device
  - Aruba AP AC-DC adapter kit (sold separately)
- Aruba Mobility Controller provisioned on the network:
  - Layer 2/3 network connectivity to your access point
  - One of the following network services:
    - Aruba Discovery Protocol (ADP)

- DNS server with an “A” record
- DHCP Server with vendor-specific options

Summary of the Setup Process

It is important that you verify the items listed under Pre-Installation Checklist before you attempt to set up and install an AP-120 series AP.

Successful setup of an AP-120 series access point consists of five tasks, which must be performed in this order:

1. Verify pre-installation connectivity.
2. Identify the specific installation location for each AP.
3. Install each AP.
4. Verify post-installation connectivity.
5. Configure each AP.

Aruba Networks, in compliance with governmental requirements, has designed the AP-120 series access points so that only authorized network administrators can change the settings. For more information about AP configuration, refer to the *ArubaOS Quick Start Guide and Aruba OS User Guide*.

Access points are radio transmission devices and as such are subject to governmental regulation. Network administrators responsible for the configuration and operation of access points must comply with local broadcast regulations. Specifically, access points must use channel assignments appropriate to the location in which the access point will be used.

Verifying Pre-Installation Connectivity

Before you install APs in a network environment, make sure that the APs will be able to locate and connect to the Mobility Controller when powered on.

Specifically, you must verify the following conditions:

- When connected to the network, each AP is assigned a valid IP address
- APs are able to locate the Mobility Controller (Mobility Controller Discovery)

Refer to the *ArubaOS Quick Start* Guide for instructions on locating and connecting to the Mobility Controller.

Identifying Specific Installation Locations

RF Radiation Exposure Statement: This equipment complies with FCC RF radiation exposure limits. This equipment should be installed and operated with a minimum distance of 13.78 inches (35 cm) between the radiator and your body for 2.4 GHz and 5 GHz operations. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. When operated in the 5.15 to 5.25 GHz frequency range, this device is restricted to indoor use to reduce the potential for harmful interference with co-channel Mobile Satellite Systems.

You can mount the AP-120 series access point on a wall or on the ceiling. Use the AP placement map generated by Aruba's RF Plan software application to determine the proper installation location(s). Each location should be as close as possible to the center of the intended coverage area and should be free from obstructions or obvious sources of interference. These RF absorbers/reflectors/interference sources will impact RF propagation and should have been accounted for during the planning phase and adjusted for in RF plan.

Unidentified Known RF Absorbers/Reflectors/Interference Sources

Identifying known RF absorbers, reflectors, and interference sources while in the field during the installation phase is critical. Make sure that these sources are taken into consideration when you attach an AP to its fixed location.

RF absorbers include:

- Cement/concrete: Old concrete has high levels of water dissipation, which dries out the concrete, allowing for potential RF propagation. New concrete has high levels of water concentration within the concrete, blocking RF signals.
- Natural Items: Fish tanks, water fountains, ponds, and trees
- Brick

RF reflectors include:

- Metal Objects: Metal pans between floors, rebar, fire doors, air conditioning/heating ducts, mesh windows, blinds, chain link fences (depending on aperture size), refrigerators, racks, shelves, and filing cabinets
- Do not place an AP between two air conditioning/heating ducts. Make sure that APs are placed below ducts to avoid RF disturbances.

RF interference sources include:

- Microwave ovens and other 2.4 or 5 GHz objects (such as cordless phones)
- Lunch rooms and call centers with cordless headsets

Installing the AP

Service to all Aruba Networks products should be performed by trained service personnel only.

Using the Integrated Wall-Mounting Slots

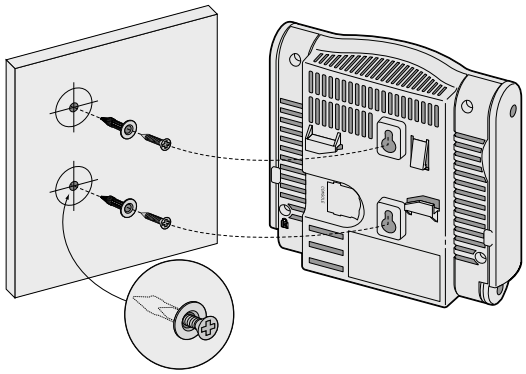
The keyhole-shaped slots on the back of the AP can be used to attach the device upright to an indoor wall or shelf. When you choose the mounting location, allow additional space at the right of the unit for cables.

For product dimensions, see Product Specifications in this guide. Allow 2 inches (5 cm) of additional space at the right side of the installed unit for cables, and make sure enough space is available for antenna articulation.

1. At the mounting location, install two screw on the wall or shelf, 1 7/8 inches (4.7 cm) apart. If you are attaching the device to drywall, Aruba recommends using appropriate wall anchors (not included).

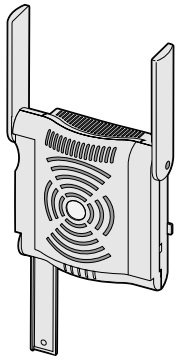
2. Align the mounting slots on the rear of the AP over the screws and slide the unit into place (see Figure 2).

Figure 2 *Installing the AP-120 series Access Point on a Wall*



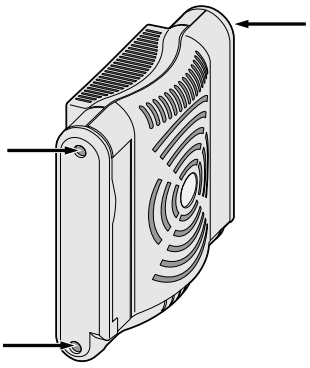
3. On the AP-121 or AP-125, orient the antennas. For best performance, swivel the antennas so that they are oriented vertically, preferably in the same plane, parallel to the wall (see Figure 3).

Figure 3 *Antenna Orientation on a Wall-Mounted AP-121/AP-125*



On the AP-120 or AP-124, install the external antennas according to the manufacturer's instructions, and connect the antennas to the antenna interfaces on the AP (see Figure 4).

Figure 4 *Antenna Interfaces on the AP-120/AP-124*



Using the Integrated Ceiling Tile Rail Slots

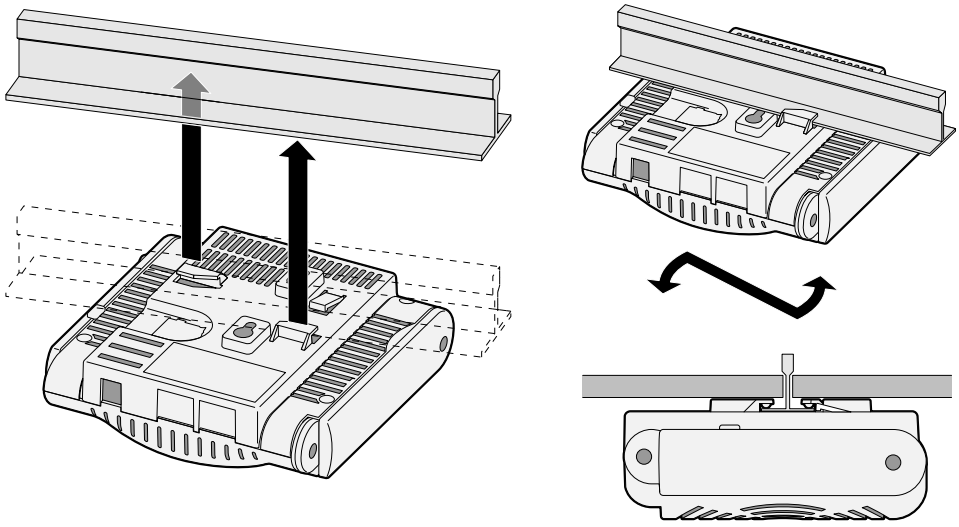
The snap-in tile rail slots on the rear of the AP can be used to securely attach the device directly to a 15/16” wide, standard ceiling tile rail.

CAUTION

Make sure the AP fits securely on the ceiling tile rail when hanging the device from the ceiling, because poor installation could cause it to fall onto people or equipment.

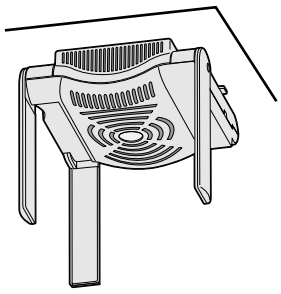
1. Pull the necessary cables through a prepared hole in the ceiling tile near where the AP will be placed.
2. If necessary, connect the console cable to the console port on the back of the AP.
3. Hold the AP next to the ceiling tile rail with the ceiling tile rail mounting slots at approximately a 30-degree angle to the ceiling tile rail (see Figure 5). Make sure that any cable slack is above the ceiling tile.

Figure 5 *Orienting the Ceiling Tile Rail Mounting Slots*



4. Pushing toward the ceiling tile, rotate the AP clockwise until the device clicks into place on the ceiling tile rail.
5. On the AP-121 or AP-125, orient the antennas. For best results, rotate the antennas so that they are vertical (perpendicular to the body of the AP) (see Figure 6).

Figure 6 *Antenna Orientation on a Ceiling-Mounted AP-121/AP-125*



On the AP-120 or AP-124, install the external antennas according to the manufacturer’s instructions, and connect the antennas to the antenna interfaces on the AP (see Figure 4).

Connecting Required Cables

Install cables in accordance with all applicable local and national regulations and practices.

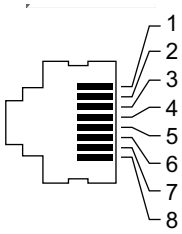
Ethernet Ports

The RJ45 Ethernet ports (ENET0 and ENET1) support 100/1000Base-T auto-sensing MDI/MDX connections. Use these ports to connect the AP to a twisted pair Ethernet LAN segment or directly to an Aruba Mobility Controller. Use a 4- or 8-conductor, Category 5 UTP cable up to 100 m (325 feet) long.

Aruba 12x APs are intended only for installation in Environment A as defined in IEEE 802.3.af, Power over Ethernet. All interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connections.

The 100/1000 Mbps Ethernet ports are on the bottom of the AP. These ports have RJ-45 female connectors with the pin-outs shown in Table 1.

Table 1 *Connector for Ethernet Ports ENET0 and ENET1*

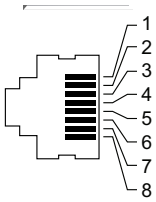
Connector	Pin	Signal Name	GE Connection	FE Connection	PoE
	1	BI_DA+	Bi-directional pair A+	RX+	POE negative
	2	BI_DA–	Bi-directional pair A–	RX–	POE negative
	3	BI_DB+	Bi-directional pair B+	TX+	POE positive
	4	BI_DC+	Bi-directional pair C+	Spare pair	POE positive
	5	BI_DC–	Bi-directional pair C–	Spare pair	POE positive
	6	BI_DB–	Bi-directional pair B–	TX–	POE positive
	7	BI_DD+	Bi-directional pair D+	Spare pair	POE negative
	8	BI_DB–	Bi-directional pair D–	Spare pair	POE negative

Serial Console Port

The serial console port allows you to connect the AP to a serial terminal or a laptop for direct local management. This port is an RJ-45 female connector with the pinouts described in Table 2. Connect this port in one of the following ways:

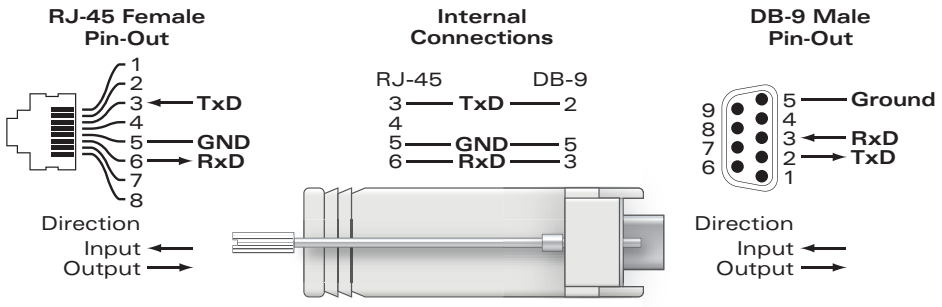
- Connect it directly to a terminal or terminal server using an Ethernet cable.
- Use a modular adapter to convert the RJ-45 (female) connector on the AP to a DB-9 (male) connector, and connect the adapter to a laptop using an RS-232 cable. See Figure 7 for connector details of the adapter.

Table 2 *Connector for Serial Console Port*

Connector	Pin	Signal Name	Function
	3	TXD	Transmit
	4	GND	Ground
	5	GND	Ground
	6	RXD	Receive

Pins not listed are not connected.

Figure 7 *RJ-45 (Female) to DB-9 (Male) Modular Adapter Conversion*



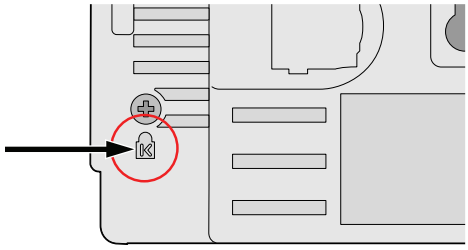
Power Connection

The AP-120 series AP has a single 5V DC power jack socket to support powering through an AC-to-DC mains electric power adapter.

Connecting a Security Cable

To provide added security for the AP-121 or AP-125, you can attach a security cable to the back of the unit (see Figure 8).

Figure 8 *Security Lock Connection*



Verifying Post-Installation Connectivity

The integrated LEDs on the AP can be used at this point to verify that the AP is receiving power and initializing successfully (see Table 3). Refer to the *ArubaOS Quick Start Guide* for further details on verifying post-installation network connectivity.

Table 3 *AP-120 Series LED Meanings*

LED	Color/State	Meaning
PWR	Green steady	Power on, device ready
	Green flashing	System initializing
	Red steady	System failed to initialize, contact TAC
ENET 0 (100/1000 Mbps)	Green/Amber off	No link
	Green on	1000 Mbps link
	Amber on	100 Mbps link
	Green/amber blinking	Data activity
ENET 1 (100/1000 Mbps)	Green/Amber off	No Link
	Green on	1000 Mbps link
	Amber on	100 Mbps link
	Green/amber blinking	Data activity
11A/N	Amber	Wireless link is legacy 11a

Table 3 *AP-120 Series LED Meanings*

LED	Color/State	Meaning
	Green	Wireless link is 11n 5 Ghz band
	Red	Only two transmit chains are available, typically due to power supply constraints (only applies if you are using ArubaOS 3.3.0 to 3.3.1.16 or 3.3.2.4)
11B/G/N	Amber	Wireless link is legacy 11b or 11g
	Green	Wireless link is 11n 2.4 Ghz band
	Red	Only two transmit chains are available, typically due to power supply constraints (only applies if you are using ArubaOS 3.3.0 to 3.3.1.16 or 3.3.2.4)

Configuring the AP-12x

AP Provisioning/Reprovisioning

Provisioning parameters are unique to each AP. These local AP parameters are initially configured on the Mobility Controller which are then pushed out to the AP and stored on the AP itself. Aruba recommends that provisioning settings be configured via the ArubaOS Web UI only. Refer to the *ArubaOS User Guide* for complete details.

AP Configuration

Configuration parameters are network or controller specific and are configured and stored on the Mobility Controller. Network configuration settings are pushed out to the AP(s) but remain stored on the Mobility Controller.

Configuration settings can be configured via the ArubaOS Web UI, ArubaOS CLI, or Aruba MMS. Refer to their respective guides for further details: the *ArubaOS User Guide* or *Aruba Mobility Management System User Guide*.

Product Specifications

Mechanical

- Dimensions (antenna stowed) (HxWxD):
  - 4.9 inches x 5. 13 inches x 2 inches
  - 12.4 cm x 13 cm x 5.1 cm
- Weight: 15 oz/0.42 kg
- Shipping Dimensions:
  - 9.5 inches x 7.25 inches x 4.5 inches
  - 24.1 cm x 18.4 cm x 11.4 cm
- Temperature:
  - Operating: 0°C to 50°C (32°F to 122°F)
  - Storage: –10°C to 70°C (14°F to 158°F)

During normal operation, the temperature of the base of the AP-12x can approach 80°C (176°F). This is within the expected operating temperature range.

- Relative Humidity: 5% to 95% non-condensing

- Altitude: 8,000 ft @ 28ºC (82.4ºF)
- Mounting: Wall, ceiling, or desktop mountable
- Antennas:
  - 3 integrated articulating dual-band antenna elements (AP-121, AP-125)
  - 3 RP-SMA interfaces for external antennas (AP-120, AP-124)
- Visual Status Indicators (LEDs): See Table 3

Electrical

- Ethernet:
- 2 x 100/1000 Base-T auto-sensing Ethernet RJ-45 Interfaces
- MDI/MDX
- IEEE 802.3 (10Base-T), IEEE 802.3u (100Base-T). IEEE 802.3ab (1000Base-T)
- Power over Ethernet (IEEE 802.3af compliant), 48V DC/200mA (see Table 1 for pin configuration)

- Power:
  - 5 VDC power interface, supports powering through an AC-to-DC mains electric power adapter

If a power adapter other than the one provided by Aruba Networks is used in the US or Canada, it should be cULus (NRTL) Listed, with an output rated 5 VDC, minimum 4A, marked “LPS” or “Class 2,” and suitable for plugging into a standard power receptacle in the US and Canada.

  - POE support on Ethernet ports:
    – 802.3af-compliant POE sourcing devices
    – POE+ (56 V @ 350 mA)

Wireless LAN

- Network Standards: IEEE 802.11b, IEEE 802.11g, IEEE 802.11a, and IEEE 802.11n (draft)
- Antenna Type:
  - Integrated 802.11a/b/g/n omni-directional high-gain antenna
  - Detachable 802.11a/b/g/n omni-directional high-gain antenna
- Antenna Gain (Integrated Antennas):
  - 2.4 – 2.5 GHz/3.2 dBi (max)
  - 5.180 – 5.825 GHz/5.2 dBi (max)
- Radio Technology:
  - Orthogonal Frequency Division Multiplexing (OFDM)
  - Direct Sequence Spread Spectrum (DSSS)
- Radio Modulation Type:
  - 802.11b - CCK, BPSK, QPSK
  - 802.11g - CCK, BPSK, QPSK,16-QAM, 64-QAM
  - 802.11a - BPSK, QPSK,16-QAM, 64-QAM
  - 802.11n draft 2.0
- Media Access Control: CSMA/CA with ACK

- Supported Frequency Bands 2.4GHz:
  - 2.400 ~ 2.4835GHz (Global), channels country specific
- Supported Frequency Bands 5GHz:
  - 5.150 ~ 5.250GHz (low band), country-specific
  - 5.250 ~ 5.350GHz (mid band), country-specific
  - 5.470 ~ 5.725GHz (Europe), country-specific
  - 5.725 ~ 5.825GHz GHz (high band), country-specific
- Data Rates:
  - 802.11b - 1, 2, 5.5, 11 Mbps per channel
  - 802.11g - 6, 9, 12, 18, 24, 36, 48 and 54 Mbps per channel
  - 802.11a - 6, 9, 12, 18, 24, 36, 48 and 54 Mbps per channel
  - 802.11n - Data rate MCS0 – MCS15 (from 6.5 Mbps to 300 Mbps)

Safety and Regulatory Compliance

Aruba Networks provides a multi-language document that contains country-specific restrictions and additional safety and regulatory information for all Aruba access points. This document can be viewed or downloaded from the following location:

www.arubanetworks.com/safety_addendum

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Proper Disposal of Aruba Equipment

For the most current information about Global Environmental Compliance and Aruba products, see our website at www.arubanetworks.com.

Waste of Electrical and Electronic Equipment

Aruba products at end of life are subject to separate collection and treatment in the EU Member States, Norway, and Switzerland and therefore are marked with the symbol shown at the left (crossed-out wheelie bin). The treatment applied at end of life of these products in these countries shall comply with the applicable national laws of countries implementing Directive 2002/96EC on Waste of Electrical and Electronic Equipment (WEEE).

European Union RoHS

Aruba products also comply with the EU Restriction of Hazardous Substances Directive 2002/95/EC (RoHS). EU RoHS restricts the use of specific hazardous materials in the manufacture of electrical and electronic equipment. Specifically, restricted materials under the RoHS Directive are Lead (including Solder used in printed circuit assemblies), Cadmium, Mercury, Hexavalent Chromium, and Bromine. Some Aruba products are subject to the exemptions listed in RoHS Directive Annex 7 (Lead in solder used in printed circuit

assemblies). Products and packaging will be marked with the “RoHS” label shown at the left indicating conformance to this Directive.

China RoHS

Aruba products also comply with China environmental declaration requirements and are labeled with the “EFUP e” label shown at the left.

Battery Replacement

Batteries included with Aruba Networks products must be replaced by qualified Aruba Networks service personnel only. Contact Aruba Networks for battery replacement. Do not attempt to replace the battery. There is a risk of explosion if you install the wrong type of battery. Dispose of batteries according to the instructions.

ARUBA networks

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